

# India's Digital Rupee - A Rival for Cryptocurrencies ?

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## Abstract

The introduction of Central Bank Digital Currencies (CBDCs) as legal tender in various countries is something that several central banks around the world are planning in the near future. The Reserve Bank of India (RBI) has also announced similar plans and an Indian CBDC can be expected soon. An evaluation of the potential and difficulties of CBDC adoption is essential for any impact assessment. The current financial system is watching the entry of CBDC. The development of CBDC accelerates the advancement of blockchain technology and virtual currencies with the support of central banks around the world. In this study, we examine existing CBDC research in different countries. This research paper analyzes the differences between the Indian digital rupee and private cryptocurrencies. Our current analysis can offer recommendations for the introduction of digital rupee in India.

**Keywords:** RBI, CBDC, Monetary Policy, Digital Rupee, Digital Currencies, Cryptocurrency.

## 1. Introduction

India is becoming the fastest growing economy in the world. There have been many innovations in the banking sector. The currency used for trading is issued by the country's central bank. Technological progress is happening day by day. India is now innovating in the digital payment structure. Thus, the role of cash in payment systems is declining. The idea of digital cash was introduced by David Chaum in his research paper in 1983. In 1989, he founded a company called "Digicash", which became the basis of digital currency. Digicash uses a digital currency called cyberbucks. Ecash launched in 1990.

Cryptocurrency has been growing in importance recently. A cryptocurrency is a private digital currency that uses cryptography to secure transactions. Any person anywhere in the world can transact in private cryptocurrencies. Now cryptocurrencies like blockchain are very popular. A digital currency based on blockchain technology was launched by Satoshi Nakamoto in 2008. Bitcoin is a private digital currency. Bitcoin has made a breakthrough in private digital currency business. Many other

cryptocurrencies have also been developed. Government and central banks are more concerned about the growth of private cryptocurrencies. People started investing more in cryptocurrencies. This affects the nation's monetary policy. The central bank will not be able to control the money supply. So many countries were against these private cryptocurrencies. Central Bank Digital Currencies (CBDCs) have been introduced independently. So the problems with private cryptocurrencies have been solved. The Reserve Bank of India plans to launch a CBDC called "Digital Rupee" in 2022-23. "Digital Rupee" will become legal tender like "Indian Rupee".

Although CBDC is a digital currency, it cannot be compared to the private virtual currencies or cryptocurrencies that have exploded in the last decade. Since there is no issuer, private virtual currencies do not represent the debt or liability of any person.

The future of value transfer is likely to be shaped by CBDC as a financial services innovation. Unlike the current system of mobile wallets provided by private companies, the Reserve Bank's digital rupee could track all transactions. CBDCs can help the central bank continue to fulfill its mandate to deliver money, preserve financial stability and ensure 24/7 access in a fully digital economy.

The desire for faster payments, rapid digitization and greater risk mitigation in clearing and settlement is driving the global need for CBDCs. Financial inclusion and more efficient internal and international value transfers are also requested. These changes made central banks and governments realize the need for attempts to explore a digital form of fiat currency. A 2021 study by the Bank of International Settlements (BIS) found that 86 percent were actively exploring the potential of CBDCs, 60 percent were

experimenting with the technology, and 14 percent were implementing trial programs. This research will focus on the differences that occur after the creation of the Digital Rupee. (Livemint, 2022), (Economic Times, 2022)

### **Literature Review**

O Ward, S Rochemont (2019). This research paper provides an in-depth understanding of Central Bank Digital Currencies (CBDCs). Now many central banks are issuing digital currencies. The introduction of CBDC will have an impact on financial intermediation. Central banks cannot control a private digital currency. In order to explore the possibility of issuing central bank digital currencies, central banks have launched exploratory projects. The impact of CBDC on interest rates, financial stability and security must be carefully considered. Changes in financial intermediation would affect banks' funding and liquidity. Cryptocurrencies have been made possible by technological advancements. Blockchain enables transactions without the need for a central authority and offers benefits that have been touted as key to the future expansion of international trade. Central banks are unsure whether the technology is advanced enough to replace current systems and combat issues related to performance, interoperability, scalability and security.

M Davoodalhosseini, F Rivadeneyra, Y Zhu (2020). This article discusses the impact of CBDC on monetary policy. After the introduction of CBDC, there can be both positive and negative effects on monetary policy. These facts are discussed in detail. Central banks and many academics are still debating the possibility of issuing CBDCs. There are many pros and cons to issuing CBDCs. Arguments and talk about the limitations and implications of the CBDC form are discussed here. CBDC has an impact on market deposits.

Alonso, S. L. N., Jorge-Vazquez, J., & Forradellas, R. F. R. (2021). This research paper mainly focuses on the current state of CBDCs and how many countries are implementing them after conducting many pilot studies. CBDC has many advantages and disadvantages. This can only be understood after the long-term introduction of these currencies. CBDC has become popular only recently. A central bank would create and support a CBDC, which would be an

electronic form of money that individuals and organizations could use to make payments and store value. 10, 50 or 100 monetary units of CBDC would always correspond to 10, 50 or 100 monetary units of banknotes or conventional physical coins. CBDC would be denominated in dollars, euros, yen or any other currency, just like notes or physical coins. While in theory a CBDC may be comparable to a digital banknote, its actual properties will depend on its final design and may vary.

### **Objectives Of The Study**

1. To study about Indian digital rupee and its effect on private cryptocurrencies.
2. Study the difference between private cryptocurrencies and CBDC.
3. To study the disadvantages of implementing CBDC.

### **Research Methodology**

This research is based on the objectives stated above. In order to conduct a thorough analysis of the topic, secondary data sources were explored. Various reviews from websites, journals and publications were used for this approach. The examination of the data was facilitated by newspaper reports and circulars of several international organizations.

### **What is CBDC?**

A central bank digital currency (CBDC) is a digital currency issued and regulated by a country's central bank. It will provide more safety and security compared to private cryptocurrencies. It will promote financial inclusion. Now CBDC is exploring nearly 100 countries.

### **Advantages of CBDC**

#### **1) If a currency is introduced, it will ensure public access to legal tender**

CBDC is legal tender issued by a central bank in electronic form. So it will create liquidity for the banks.

#### **2) A CBDC would improve the effectiveness of monetary policy.**

The normal short-term interest rate cuts by central banks during recessions are intended to increase overall investment and consumption. CBDC may have an impact on the deposit market. A CBDC with a non-zero interest rate can act as a floor for deposit rates if bank deposits and CBDC are close substitutes. The

CBDC rate may have an impact on the deposit market even if it is not widely adopted by providing an alternative to depositors, competition would increase. Another weapon of monetary policy could be interest rates on CBDC deposits, although they would need to be adjusted in line with existing monetary policy rates. The transmission of monetary policy would be improved as a result of a closer relationship between deposit rates and the CBDC and other monetary policy rates.

### **3) CBDC does not go bankrupt**

A CBDC does not go bankrupt because it is under the control of a central bank. It provides liquidity compared to cryptocurrencies.

### **4) CBDC is programmable money**

It's programmable money. So it can be used for a specific purpose.

### **5) CBDC uses blockchain technology**

CBDC uses blockchain technology. This will increase the security of digital transactions. Since this blockchain is not decentralized, access to the blockchain will be limited to approved central bank participants.

### **6) Faster payments**

Faster processing is possible with CBDC payment.

### **7) No processing delays**

There are no unwanted processing delays for CBDC transactions.

### **8) Cheaper payments**

Payments are cheaper. It involves very less cost.

### **9) Cross-border transactions will be easier**

The CBDC payment platform will help simplify cross-border payments.

### **10) Reduces settlement risk**

CBDC payments will reduce settlement risk.

### **11) The burden on cash transactions can be reduced**

Cash transactions may be restricted. This digital currency can be used instead of cash.

### **12) Dependence on the dollar can be reduced.**

Greater dependence on the US dollar can be reduced.

## **TYPES OF CBDC**

### **1. Wholesale CBDC**

Financial institutions that are subject to regulation can use wholesale CBDC. They extend the current two-tier arrangement, which places the central bank at the heart of the payment system and gives payment service providers responsibility for customer-facing activities. The central bank allocates accounts to commercial banks and other payment service providers, and domestic payments are settled on the central bank's balance sheet. CBDCs for wholesale transactions are intended to settle interbank transfers and other relevant wholesale transactions such as payments between financial institutions. These may include international payments or digital assets. Central bank reserves and wholesale CBDCs work quite similarly. In order to settle the transaction, the bank that has net liabilities to the rest of the system is deducted, and the bank that has net claims on the system is credited. Settlement in wholesale CBDCs also enables new types of payment terms that require a payment to be settled only in exchange for the delivery of another payment or the delivery of an asset. These conditional payment orders can improve the delivery against payment mechanism in RTGS systems. (BIS, 2021)

### **2. Retail CBDC**

Simply put, Retail CBDC is issued by a central bank to the public. Retail CBDCs change the traditional two-tier monetary system by allowing the public to access central bank digital money in the same way they access cash as direct claims against the central bank. Retail CBDCs have the advantage of not posing any credit risk to users of the payment system, as they represent a direct claim against the central bank. A retail CBDC is comparable to a digital version of cash that central banks are primarily responsible for providing. Other types of digital retail money are claims against intermediaries. Due to short-term cash shortages or even insolvency, such intermediaries may experience illiquidity, which may also cause payment interruptions. Retail CBDCs would eliminate any remaining risks, although in most situations these risks are already significantly reduced through hedging and other measures. CBDCs sold in stores come in two varieties. One solution creates a design that resembles

cash and enables so-called token access and payment anonymity. Using private public key encryption and a password-like digital signature, this solution would give certain people access to the CBDC without the need for personal identity. An alternative approach, known as the "account-based approach", is based on verifying the user's identification and is based on a digital identity scheme. The second approach would not exclude privacy protection and is more conducive to monitoring illegal activities in the payment system. Retail CBDCs would eliminate any remaining risks, although in most situations these risks are already significantly reduced through hedging and other measures. CBDCs come in two varieties. One solution creates a design that resembles cash and enables so-called token access and payment anonymity. Using private public key encryption and a password-like digital signature, this solution would give certain people access to the CBDC without the need for personal identity. An alternative strategy, known as "account-based access", is based on verifying the user's identification and is based on a digital identity scheme. This second approach would not exclude privacy protection and is more conducive to tracking illegal activities in the payment system. (BIS, 2021)

## Some Countries Using CBDC

### 1. The Bahamas

The Bahamas Central Bank issued the Sand Dollar in 2020. It was the first CBDC in the world to cover the entire country. This currency is a digital form of the Bahamian dollar. All residents of the country will have access to this currency using mobile applications or payment cards. This currency takes steps to control money laundering and other types of fraud. Just recently, facial recognition authentication is also available for Sand Dollar.

### Features of Sand Dollar

#### 1. This currency can be accessed using mobile applications or payment cards.

It is very convenient for people. They can access this currency using mobile apps or payment cards.

#### 2. This currency has very advanced technology to check money laundering and other such frauds.

The introduction of this currency has helped in the fight against money laundering and similar other frauds.

### 3. Blockchain technology is used

Here, blockchain technology helps enable peer-to-peer transactions. Reduces transaction costs in payments. (Consulting.us, 2021)

### 2. Nigeria

The Central Bank of Nigeria issued the e-naira in 2021. Nigeria is the first African country to implement a CBDC. eNaira uses the same blockchain technology used by many private cryptocurrencies. It is stored in digital wallets and used just like cash. This currency can be digitally converted. This has increased financial inclusion and also simplified transaction tracking.

### Main features of e-Naira currency

#### 1. It uses blockchain technology

eNaira uses blockchain technologies like Ethereum and Bitcoin. Blockchain technology provides security using cryptographic algorithms. It uses encryption to secure data.

#### 2. Increased speed for payment transfer

There is greater speed when transferring payments.

#### 3. Transaction monitoring to prevent fraud

It tracks all transactions to help prevent fraud.

#### 4. Lower costs

It has a lower cost compared to a private digital currency.

#### 5. Inclusion of unbanked Nigerians with phones through the ability to receive salary payments as well as payments for goods and services

She promoted the inclusion of unbanked Nigerians. It also helped to receive and make payments using mobile phones.

#### 6. Options as a new trading mechanism with less expensive and secure transactions

It is much cheaper and more secure compared to private digital currency.

#### 7. Better security with a unique identity and security framework

It has better security due to its unique identity and security structure.

### **8. Promotes cashless policy among merchants while helping to mitigate the risk of carrying cash**

This currency supports a cashless society and this can reduce the use of cash. (IMF, 2021)

### **3. Eastern Caribbean Union**

To facilitate quick transactions and help those without bank accounts, seven countries in the Eastern Caribbean Union have developed their own digital money. The seven nations are Antigua and Barbuda, Dominica, Grenada, Montserrat, Saint Lucia, Saint Kitts and Nevis, and Saint Vincent and the Grenadines. Several countries are currently piloting CBDCs. On March 12, 2019, the Eastern Caribbean Central Bank (ECCB) unveiled its famous DXCDCaribe pilot project. For the international currency code for the euro (XCD), the "D" prefix stands for digital. A digitally issued and securely minted version of the EC DCash currency is used in the pilot operation. The objective of this pilot project is to evaluate the efficiency and welfare improvements that could be achieved in the areas of increased financial inclusion, economic development, resilience and competitiveness in ECCU through the introduction of DCash. (ECCB, 2022)

### **4. Russia**

The Bank of Russia said it plans to start consumer tests in April 2023, not 2024, and is already testing its digital ruble with 12 institutions. The central bank has claimed that it is more likely to have a launch plan by 2023, however the central bank digital currency (CBDC) may be fully functional in 2023. It has also been confirmed that the virtual ruble could serve as a replacement for SWIFT. The inclusion in the digital yuan, which China has been testing with consumers since October 2020, has been the subject of news. One of the first incentives for the introduction of the pilot project in June 2021 was to address concerns about bank concentration. However, their more intensive attempts may be explained by the current ban on SWIFT. (Ledger Insights, 2022)

### **5. Sweden**

Sweden's central bank developed a CBDC called "e-krona" in 2017. This digital currency is now in the testing phase. According to the Riksbank, the country's national bank, the asset is now technically ready to integrate into banking networks and facilitate transactions. During the second part of the e-krona

pilot project, which started in February 2021, the CBDC was tested for its technological ability to function within the current national digital banking infrastructure. Participating banks included Tietoevry and Handelsbanken.

According to the study, it was possible to convert e-krona to fiat currency and use it for online and offline purchases. (Cointelegraph, 2022)

### **6. China**

China is the biggest country to test digital currency. It was tested in April 2020. In April 2020, China became the first major economy in the world to test a digital currency. The Central Bank of China issued the Digital Yuan as a CBDC. It's cheaper and faster. The E-CNY app has been launched in China on Android devices. This application helps users to transfer money from bank accounts to top up e-wallet and to choose the applications they should use to trade e-CNY. (China Briefing, 2022)

### **7. Jamaica**

The Central Bank of Jamaica plans to launch the Jamaican Digital Exchange as a CBDC. It is in the pilot testing phase. Bank of Jamaica legalized JAM-DEX. (Outlook India, 2022)

### **8. Canada**

Canada is trying to work on CBDC since last year 2020. Plans to launch 'Digital Loonie'. It is now in the development phase. Canada provides no timeline for establishing a CBDC (financial contribution, 2021)

### **9. U.S.A**

Research into CBDC development is underway here. The US plans to build a CBDC using a digital dollar that provides cheaper and faster settlement of transactions. (CNBC, 2022)

### **10. United Kingdom**

The UK plans to build a CBDC with a nominal value in pounds sterling. They believe that CBDC will make payments faster, more efficient and cheaper. The creation of a CBDC will make the UK financial system more resilient. (Bank of England, 2022)

### **11. Mexico**

Mexico plans to launch CBDC in 2025. It will become one of the first countries to launch CBDC in Latin

America. Research is now underway. (Ledger Insights, 2022)

### **What Is Digital Ruppy?**

The digital rupee is a digital currency to be introduced by the Reserve Bank of India (RBI) in 2022-23. This digital currency is used digitally instead of physical cash and is controlled by the Reserve Bank of India (RBI). It is a form of central bank digital currency (CBDC). This currency is the same as fiat currency. The introduction of this currency will support the digital economy. CBDC ensures that people are prepared for future changes and provides much needed sovereignty. As for the future of global trade, the digital rupee, which was the first attempt, will undoubtedly give way to multi-currency CBDCs, allowing India to trade alongside other strong and reliable trading partners. The digital rupee is equivalent to the physical rupee. The plan to issue a digital rupee was announced in the budget speech by India's finance minister on February 1, 2022. It will be cheaper than credit and debit cards. No need to carry digital rupees as cash. The speed of transactions will also increase. The digital rupee uses Distributed Ledger Technology (DLT), i.e. Blockchain technology. The Reserve Bank of India's (RBI) digital rupee, based on blockchain technology, will ensure that the general public can benefit from cryptocurrency without having to worry about its potential downsides. Digital Rupee gives users more flexibility compared to riskier virtual digital assets as it always ensures trusted transactions. Moreover, this currency will not be affected by erratic market fluctuations. As it is governed and enforced by the RBI, the digital rupee will withstand adverse market conditions even in unusual times like a pandemic. The RBI said, "The Reserve Bank proposes to adopt a phased approach to CBDC rollout, going through Proof of Concept, Pilot and Launch phases step by step," The initial phase starts with proof of concept. The idea is tested in the proof-of-concept phase and the test results are validated to ensure that the implementation will produce the same results as expected. Proof of concept is the initial stage in which an idea is tested and the result of the test is verified to ensure that the implementation produces the same results as intended (Economic Times, February 2022), (CNBC, February 2022), (Economic Times, May 2022) .

### **Advantages of Digital Rupee**

#### **1) Central banks cannot control a private digital currency.**

Central banks issue CBDCs to control supply and demand. If there is widespread adoption of private digital currencies, it can affect the financial system. This will affect financial instability. This will be driven to some extent by the CBDC.

#### **2) Reduce transaction costs**

The digital rupee will reduce transaction costs as transactions are entered in real time. So it can reduce transaction costs.

#### **3. Will be available 24\*7**

Transactions can be done 24\*7. You don't need physical currency in hand to make a purchase.

#### **4. There is no risk of volatility**

Since the digital rupee is backed by the Bank of India, there is no risk of volatility.

#### **5. No physical damage to the currency**

There is no digital currency commodity. So there is no risk of physical damage to the currency. (CNBC, February 2022),

### **Limitations**

#### **1. Traceability of transactions**

The central bank will be able to monitor all transactions made by the customer. Like all online debit and credit card transactions, these transactions will be traceable. Transactions cannot be made anonymously.

#### **2. Negative interest rates**

Customers cannot accumulate money. Central banks will introduce negative interest rates. This will encourage overspending among customers.

#### **3. Operational burden of central banks in maintaining CBDC**

Because everything will be digitized. Banks are worried about money that is digitally held in a customer's account. They must check for vulnerabilities in networks and create secure networks. This requires a huge amount of maintenance.

#### **4. Cyber attacks**

If the banking network is breached, it will be a huge problem. All money is kept in digital form. So the risk is very high. (Economic Times, May 2022).

## **The Difference Between Cryptocurrency And CBDC**

### **1. Regulatory organization**

Cryptocurrencies are stored on a decentralized blockchain network. The CBDC is completely controlled by the central bank of that country.

### **2. Form of money**

Cryptocurrency is a store of value. CBDC is a digital form of fiat currency.

### **3. Value of the underlying asset**

Cryptocurrency has no intrinsic value. The underlying asset has no value. CBDCs are digital assets.

### **4. Information Shared**

In cryptocurrency, transactions are available on a decentralized ledger. But in CBDC, transactions are known only to the sender, receiver and banking institution.

### **5. Security**

Cryptocurrencies are secured with an encryption method, while CBDCs are secured with strong passwords (CNBC,2022)

### **Conclusion**

The introduction of a digital rupee will help expand the digital economy and also strengthen the banking system. The introduction of a digital rupee can have positive or negative effects. The use of cash should be managed. People would probably look for CBDC alternatives just when central banks are looking for negative interest rates. Alternatives may come in the form of foreign money or personal cryptocurrencies, increasing the risk of widespread adoption. Because these alternatives are not expressed in the domestic unit of account, this would ultimately reduce the effectiveness of monetary policy. Thus, policymakers need to carefully assess the potential of the digital rupee in India, while also considering its macroeconomic and liquidity implications, banking systems and money markets.

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